

ATTACHMENT C
PLACEMENT ANALYSIS

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James and Barren Island Dredged Material Placement Analysis

To develop the criteria to use in the dredged material placement model, information from the existing Poplar Island was used. Poplar Island currently consists of an 1140 acre project with 50 percent of the area designated for upland habitat development and 50 percent designated for wetland habitat development. The actual acreage of each habitat zone is reduced by the area consumed by the footprint of the containment dikes such that the actual placement area within the cells is reduced to about 90 percent of its nominal area. The various alternatives developed during the course of this study were used in the placement analysis.

During the formulation process, consideration was given to changing the upland-wetland ratio to favor the wetland acreage where more environmental benefits are realized. It has been generally understood that efficient use of the site requires that a balance between upland and wetland placement capacity be maintained such that the upland cells remain operational until all wetland cells are completely filled. However, that balance had not previously been formally quantified. Therefore a series of dredged material placement analyses were performed to determine the following:

- A reasonable sequence of dredged material placement and cell development for the various Mid-Bay alternatives employing efficient placement and site development methods.
- The minimum expansion project size that would support future dredged material placement requirements.
- The maximum percentage of wetlands that can be supported in the various project alternatives with the uplands at elevation +20 MLLW.
- The vertical heights required for the upland cells in order to maximize the wetlands acreage.

CRITERIA FOR PLACEMENT ANALYSIS:

General Assumptions:

- The site must be capable of accommodating annual dredged material placement of 3.2 million cubic yards for most of the project life without overloading wetland cells and with minimal overloading of upland cells. The total site acreage required to satisfy this requirement will vary depending on the proportion of upland and wetland areas and the required project life.
- The project must be evaluated independent of other projects that may exist before or after the proposed project. Any reduction in annual placement quantities that might result from other projects is to be ignored.
- Placement of dredged material should be managed to minimize placement cost (i.e. placement in adjacent cells to maximize efficiency).

- Upland cell capacity must extend at least several years beyond the last year of dredged material placement in wetland cells to assure that the excess portion of each years placement quantity can be accommodated within the site. Where a larger proportion of wetland area is desired, uplands may have to be raised to higher elevations to provide the necessary upland placement capacity.
- Actual placement areas are typically about 91% of the nominal area for each cell after deduction for the dike footprint.
- The capacity of each cell is based on a volume occupied ratio of 0.7. (The volume of the dredged material ultimately occupied within the containment site compared to volume in-situ in the channels).
- The upland capacity calculations are based on a final upland elevation of +20 MLLW unless otherwise indicated.
- Because borrow areas cannot be located within wetland cells, it must be recognized that projects consisting of 100% wetlands must obtain materials for dike construction from the access channel required to deliver dredged materials to the site, or from other borrow sources outside the project footprint. Projects consisting of 70% wetlands and 30% uplands must have upland cells strategically located over the borrow deposits to maximize internal borrow sources. The quantity of borrow material within 30% of the site may not be sufficient to supply the required dike quantities without additional sources from outside the project footprint.

Wetland Cell Construction: Wetland cell construction requires a highly ordered and controlled sequence of dredged material placement that will assure that wetland cells are never overloaded beyond the quantities required to achieve the target wetland surface elevations. The existing Poplar Island project has targeted low marsh surfaces between elevation +1.2 and +1.8 MLLW, and high marsh surfaces between +1.8 and +2.4 MLLW.

- Borrow areas must be excluded from wetland cells to assure that the thickness of the dredged material within the cells is as uniform as possible. Large differences in dredged material thickness lead to large magnitudes of settlement and large differential settlements that exceed allowable tolerances for required final surface elevations. (The wetland cells within the existing Poplar Island site include significant areas that were used as borrow sources creating excavation depressions that extend to elevation of -15 to -20 MLLW. This will result in dredged material thicknesses within those cells exceeding 20 feet and will make stabilization of those wetland surfaces problematic.)
- The time allotted for wetland cell development (i.e. placement of dredged materials, final grading and initial planting) is based on dredged material thickness ranging from 6 to 12 feet. This range of thickness relates to typical cell bottom elevations ranging from -4.5 to -10.5 and a target surface elevation of +1.5 MLLW. Greater dredged material thickness will increase the time required to reach a stable surface ready for planting and will decrease the probability of achieving any particular target surface elevation.

- Wetland cells must be subdivided into smaller subcells having dimensions not exceeding approximately 1200 to 1400 feet corresponding to cells in the 35 to 45 acre range.
 - Dredged materials will be offloaded from barges and deposited within subcells using hydraulic placement techniques. The resulting dredged material will typically consist of approximately 90% water and 10% solids. Maintenance dredged material can be expected to assume a slope of approximately 1 foot of vertical drop over 1000 feet of horizontal distance. The change in elevation of the surface of the dredged material between the discharge location and the far side of the wetland subcell cell must be limited to approximately 1 to 1.5 feet.
 - After completion of channel excavation and final grading of the de-water cell, an outlet control structure must be installed to allow the cell to be rehydrated prior to planting.
 - After completion of planting and satisfactory stabilization of adjacent subcells, temporary dividing dikes can be regraded or removed to allow tidal flooding between subcells.
- Wetland cells must never be overloaded such that the final surface elevation is higher than the maximum acceptable elevation. This could cause the surface to become unworkable by removing too much of the crust layer. Keeping the cells from being overloaded is achieved by a tightly controlled sequence of dredged material placement with diminishing quantities of material placed within the cell each year until the final placement quantity is not more than about 20,000 cubic yards.
 - Dredged materials immediately after decanting free water consist of approximately 90 percent water and 10 percent solids by volume. Ultimately, these dredged materials will consolidate to a degree that the water component occupies approximately 75 percent of the volume of the mass. The dredged material will ultimately consolidate to less than 1/2 of its initial thickness. Each layer must be closely monitored during the consolidation period to determine the actual rate and magnitude of consolidation corresponding to the specific properties of the dredged material placed in the cell each year.
 - Left to consolidate under its own weight in submerged conditions, the time to reach a stable (normally-consolidated) condition could require more than a decade depending upon the total thickness of the dredged material. The process is accelerated by dewatering the site as soon as possible after placement of each dredged material layer so that the surface receives maximum solar exposure required to generate desiccation cracks. In addition, the site must be aggressively drained by a series of perimeter and interior drainage trenches accomplished by specialized construction equipment to result in the creation of a surface crust having sufficient strength and thickness to support the construction activities required for channel excavation and surface grading.
 - The crust development and site dewatering also allow the underlying dredged material deposits to be slightly over-consolidated to minimize the risk of subsequent settlement that could result in loss of plants.
 - Based on experience to date at Poplar Island, it is estimated that the typical wetland cell development will limit the annual placement quantity to not more

- than 70% of the cell volume until the final increment of placement is less than about 20,000 cubic. That sequence corresponds to a typical dredged material placement duration of 4 years assuming that free water from each inflow event can be discharged into an adjacent wetland cell before discharging to the bay.
- After the first 50% of the wetland subcells have been completed, it will not be possible to decant free water into adjacent cells. Therefore, dredged materials will have to be held within the placement cells for a longer period of time to allow for a slow discharge of water directly into the bay once water quality criteria has been satisfied. This procedure will require dredged materials to be placed into the cells at a slower rate over a longer period of time. It has been estimated that the typical wetland cell development will limit the annual placement quantity to not more than 50% of the cell volume until the final increment of placement is less than about 20,000 cubic. That sequence corresponds to a typical dredged material placement duration of 6 years.
 - Wetland cells will typically have a system of channels with a range of width and depth dictated by hydraulic analyses and empirical information for existing wetlands. The materials excavated from these channels must be placed within the wetland cells in a manner that is consistent with the required final grades. Channels must remain stable (side slope stability and bottom elevations) to assure proper hydraulic functions. Graded areas must be stable with respect to surface elevation and erosion. It is estimated that required grading and outlet construction for each subcell will require approximately one year to accomplish. It is estimated that two subcells can be graded in any single year. Occasionally three subcells might be prepared in an exceptional year, however, in extremely wet years it may be difficult to complete the grading for any subcells.

Upland Cell Construction: Upland cell construction allows for considerably more latitude with respect to final surface elevations than the wetland areas. However, the much greater thickness of dredged material (typically 20 to 30 feet above the existing bay bottom, or 30 to 50 feet above the bottom of excavated borrow areas) will result in a very large magnitude and long duration of settlement. These factors will dictate the appropriate time frame for upland development and the final grading plan that will assure appropriate drainage of surface runoff into adjacent wetland areas. To maximize upland capacity, placement will be limited to optimum lift thickness whenever possible. Where overloading of upland cells is necessary, a corresponding reduction in placement capacity and/or increase in the time prior to development must be anticipated.

- Optimum placement is defined as the quantity of material that will result in a lift thickness not exceeding 3 feet. With proper drainage and crust management techniques applied following each placement event, a 3-foot lift will consolidate to less than half of the initial thickness. Solar exposure will desiccate the material further promoting drainage and consolidation, thereby increasing the capacity of the cell. Capacity calculations are based on the assumption that appropriate crust management techniques are applied annually.

- Overloading is defined as any annual placement quantity that exceeds the optimum by 20 percent. Such placement events have been highlighted on the spreadsheet. Occasional overload events not exceeding 50% are not likely have a significant impact on total cell capacity. However, extreme overloads of 200% or more, or a series of consecutive overloading events in the same cell are likely to have a significant impact on cell capacity.
- Upland cells will eventually be subdivided to allow for an incremental grading and planting scheme similar to the wetland development. It is anticipated that upland areas will be broken into segments approximately 80 to 125 acres in size. Placement to complete the subcell will typically require 2 to 4 years followed by a 2 to 4 year period of grading and planting.
- Final grading will include the removal of the upper portion of the containment dikes exceeding the final upland surface elevations. Typically, containment dikes are constructed to a height approximately 5 feet higher than the desired upland elevation.
- An additional phase of site grading will include the area between the upland and wetland cells. These areas will be graded to remove or soften the initial construction haul roads and to assure proper conveyance of runoff from upland surfaces to the adjacent wetland cells.

ANALYSIS OF ALTERNATIVES: Preliminary dredged material placement analyses were conducted for potential sites having areas of 600, 700, 1000, 1200, 1354, 1400, 1500, 1586, 1600, 1800, 2072, 2500, 2700, and 2756. These sites represented all potential alternatives, several Barren and James Island combinations, and several generic sites to determine optimum island acreage for placement purposes.

The analysis has shown that the alternatives could provide placement capacity ranging from approximately 27 to 102 million cubic yards (mcy) depending on the project acreage and upland to wetland ratio. If the project shifts toward a higher percentage of wetlands and a corresponding lower percentage of uplands, the total site capacity would decrease accordingly. The analysis also shows that it is necessary to retain approximately 75-80% of the total site placement capacity within the upland cells to assure that upland placement capacity lasts until at least the completion of all wetland placement. Without concurrent placement of the bulk of the annual placement quantity in upland cells, placement of the very small quantities within the last several years of wetland cell placement would become an extremely expensive operation.

The following table summarizes the alternatives analyzed for this project. As can be seen, in order to create a site with more than 50% wetlands, the size of the site must be rather large or the upland cell needs to be built to a higher elevation than +20 MLLW. This analysis helped to refine the alternatives selection.

Mid-Bay Island Placement Summary

Total Area (acres)	Alternative	Wetland Area (acres)	Capacity (mcy)	Capacity Ratio Up/Wet	Last Year @ 3.2 mcy	Years of Cell Overload	No. Wetland Cells per Year	Last Wetland Placement	Last Upland Placement
600	70% Upland-30% Wetland	180	27.5	90.3%	Year 8	8	2	Year 8	Year 9
700	70% Upland-30% Wetland	210	32.0	90.3%	Year 10	7	2	Year 8	Year 11
1000	70% Upland-30% Wetland	300	45.8	90.3%	Year 15	0	2	Year 9	Year 15
1200	50% Upland-50% Wetland	600	44.3	75.0%	Year 13	3	2	Year 14	Year 14
1354	50% Upland-50% Wetland	677	50.0	80.0%	Year 15	0	2	Year 14	Year 16
1354	45% Upland-55% Wetland	745	47.0	76.6%	Year 14	0	2	Year 15	Year 15
1354	45% Upland-55% Wetland +25 MLLW Upland	745	53.3	79.4%	Year 16	0	2	Year 15	Year 17
1354	40% Upland-55% Wetland +25 MLLW Upland	812	49.7	75.9%	Year 15	4	2	Year 16	Year 16
1354	40% Upland-55% Wetland +30 MLLW Upland	812	55.4	78.4%	Year 16	6	2	Year 16	Year 17
1400	50% Upland-50% Wetland	700	51.7	75.6%	Year 16	0	2	Year 15	Year 17
1400	40% Upland-60% Wetland +25 MLLW Upland	840	51.4	75.8%	Year 16	2	2	Year 17	Year 17
1400	40% Upland-60% Wetland +30 MLLW Upland	840	57.3	78.4%	Year 17	4	2	Year 16	Year 18
1500	50% Upland-50% Wetland	750	55.4	75.0%	Year 17	0	2	Year 15	Year 18
1500	40% Upland-60% Wetland	900	48.7	72.7%	Year 15	0	2	Year 18	Year 16
1500	40% Upland-60% Wetland w/ Accelerated Wet Dev.	900	48.7	72.7%	Year 15	1	3	Year 16	Year 16
1500	40% Upland-60% Wetland w/ +25 MLLW Upland	900	55.0	75.9%	Year 17	0	2	Year 18	Year 18
1500	40% Upland-60% Wetland w/ +30 MLLW Upland	900	61.4	78.4%	Year 19	1	2	Year 18	Year 20
1500	30% Upland-70% Wetland	1050	42.1	58.3%	Year 11	1	2	Year 20	Year 15
1586	50% Upland-50% Wetland	793	58.5	80.0%	Year 18	0	2	Year 16	Year 19
1586	45% Upland-55% Wetland	872	55.0	76.6%	Year 17	0	2	Year 17	Year 18
1586	45% Upland-55% Wetland w/ +25 MLLW Upland	872	62.5	79.4%	Year 19	0	2	Year 17	Year 20
1586	40% Upland-60% Wetland	952	51.5	72.7%	Year 16	0	2	Year 18	Year 17
1586	40% Upland-60% Wetland w/ +25 MLLW Upland	952	58.1	75.9%	Year 18	0	2	Year 18	Year 19
1586	40% Upland-60% Wetland w/ +30 MLLW Upland	952	64.8	78.4%	Year 20	0	2	Year 18	Year 21
1600	40% Upland-60% Wetland	960	52.0	72.7%	Year 16	0	2	Year 18	Year 17
1600	40% Upland-60% Wetland +25 MLLW Upland	960	58.7	75.9%	Year 18	0	2	Year 19	Year 19

1600	40% Upland-60% Wetland-+30 MLLW Upland	960	65.5	78.4%	Year 20	0	2	Year 19	Year 21
1800	40% Upland-60% Wetland	1080	58.4	72.7%	Year 18	0	2	Year 21	Year 19
1800	40% Upland-60% Wetland w/ +30 MLLW Upland	1080	73.6	78.4%	Year 23	0	2	Year 21	Year 24
1800	40% Upland-60% Wetland w/ Accelerated Wet Dev.	1080	58.4	72.7%	Year 18	0	2 to 4	Year 19	Year 19
1800	30% Upland-70% Wetland	1260	50.5	58.3%	Year 13	0	2	Year 24	Year 14
1800	30% Upland-70% Wetland w/ +47 MLLW Upland	1260	81.2	77.1%	Year 25	5	2	Year 24	Year 26
2700	45% Upland-55% Wetland	1750	93.7	77.6%	Year 29	0	2	Year 26	Year 30
2700	40% Upland-60% Wetland	1750	87.7	73.7%	Year 27	0	2	Year 27	Year 28
2500	30% Upland-70% Wetland	1750	70.1	58.3%	Year 19	0	2	Year 30	Year 20
2500	30% Upland-70% Wetland w/ Accelerated Wet Dev.	1750	70.1	63.2%	Year 21	0	3	Year 25	Year 22
2072	Alignment 5 - James 50%Upland-50%Wetland	1036	76.5	80%	Year 23	0	2	Year 19	Year 24
2072	Alignment 5 - James 45%Upland-55%Wetland	1140	78.8	73.30%	Year 24	0	2	Year 20	Year 25
2072	Alignment 5 - James 45%Upland-55%Wetland w/ Borrow Excavation	1140	95.7	78.00%	Year 29	0	2	Year 20	Year 30
2072	Alignment 5 - James 40%Upland-60%Wetland	1243	67.3	72.70%	Year 20	0	2	Year 23	Year 21
2072	Alignment 5 - James 40%Upland-60%Wetland w/ Borrow Excavation	1243	89.4	74.20%	Year 27	0	2	Year 21	Year 28
2072	Alignment 5 - James 40%Upland-60%Wetland-+25 MLLW Uplands	1243	76.0	75.80%	Year 23	0	2	Year 23	Year 24
2072	Alignment 5 - James 40%Upland-60%Wetland-+30 MLLW Uplands	1243	84.7	78.30%	Year 26	0	2	Year 23	Year 27
2756	Alignment D5 - 50%Upland-50%Wetland	1378	101.7	80%	Year 31	0	2	Year 22	Year 32
2756	Alignment D5 - 45%Upland-55%Wetland	1516	91.9	77.90%	Year 28	0	2	Year 24	Year 29
2756	Alignment D5 - 40%Upland-60%Wetland	1654	85.9	74.10%	Year 26	0	2	Year 26	Year 27
2756	Alignment D5 - 40%Upland-60%Wetland-+25 MLLW Uplands	1654	97.6	77.20%	Year 31	0	2	Year 26	Year 32

The recommended plan became James Island Alignment 5, which is the 2072 acre option. Once this became the selected plan, a detailed analysis was performed for the 2072 acre option. This detailed analysis (see attached spreadsheets) included using the most accurate survey information to estimate depths at the site and also accounted for the expected amount of borrow material that will be removed from within the upland area. The detailed analysis shows that a 45% uplands/ 55% wetlands site will work for the James Island Alignment 5 configuration with uplands to +20 feet MLLW.

Comprehensive Placement Analysis of Potential Operational Impacts of the Recommended Mid-Bay Plan and Poplar Island Expansion Project. During the plan formulation phase, the placement analysis for both the Mid-Bay study and the Poplar Island Expansion study were done concurrently and independently to maximize placement efficiency and habitat benefits at both sites. Therefore, the placement analysis of the James Island project of the recommended plan as outlined thus far did not consider any influence of the Poplar Island expansion project on placement or development of habitat at James nor James Island's effect on the Poplar Island projects. Since the completion of this analysis, the Poplar Island Expansion Report has been approved and a Chief's report was signed on 31 March 2006. Assuming that the Poplar Island Expansion project is constructed, it will have the capacity to accommodate the annual maintenance dredging materials until at least 2020, and possibly slightly beyond. Additional placement analysis was performed to determine how James Island placement would potentially impact Poplar Island placement, so that impacts on habitat development could be considered. Only the placement analysis is presented in this section. The potential impacts to the habitat development and benefits are discussed in Section 4 of the main report.

Expanded Poplar Island. Poplar Island expansion will increase both the area and dredged material placement capacity of the project by approximately 50 percent. Assuming an annual dredged material placement rate of 3.2 mcy, the additional 26 million cubic yards of placement capacity will theoretically extend the project life by up to 8 years from 2014 to 2022 as shown in the attached figures. However, practical limitations during the final years of placement will reduce the theoretical annual placement capacity and require that an alternative placement site be available several years before 2022.

Combination Analysis. Three scenarios were analyzed considering Mid-Bay to be capable of receiving dredged material in 2014, 2018, or 2023. These represent the earliest and latest potential placement dates associated with the Mid-Bay project, and a more realistic intermediate date.

Placement Starting in 2014. The earliest potential date for placement at the Mid-Bay site was assumed to be 2014. At that point in time expanded Poplar Island would still have up to eight years of capacity at the assumed annual placement rate of 3.2 mcy. Although most of the wetland cell placement for the original Poplar project would have been completed by 2014, most of the wetland cells associated with the expansion

would not have been completed, and it was assumed that it would be necessary to place dredged material at both Poplar and Mid-Bay several times, and alternate placement between the two site during other years. The analysis shows overlapping placement activity from 2014 to 2027, at which time all remaining dredged material placement is assumed by the Mid-Bay site. Impact on the schedule for wetland development at Poplar Island is very minor, and upland development would be delayed by approximately 2 years. In this scenario, wetland development at Mid-Bay would begin in 2023, and between 300 and 350 acres of wetland habitat would be completed during the period of placement at both projects. Overfilling of upland cells at expanded Poplar Island is reduced by approximately 17% by bringing Mid-Bay on line in 2014.

Placement Starting in 2023. The latest possible date for placement at the Mid-Bay site was assumed to be 2023, which corresponds to the first year that expanded Poplar Island would theoretically not be able to accommodate 3.2 mcy of dredged material placement. At that point in time, placement at Poplar Island would consist of minor quantities in the final wetland cell and filling the final remaining capacity in the raised section of original Poplar Island. Because Poplar could no longer accommodate the required 3.2 mcy per year, placement would be required at both the Poplar and Mid-Bay sites for approximately four years. It is recognized that mobilization of dredged material off-loading facilities and placement pipelines at both sites adds a significant cost to the normal dredged material placement at a single site. The analysis shows overlapping placement activity from 2023 through 2026, at which time all remaining dredged material placement is assumed by the Mid-Bay site. There is essentially no impact on the schedule for both upland and wetland development at Poplar Island. In this scenario, wetland development at Mid-Bay would begin in 2028, and no wetland habitat would be initiated during the period of placement at both projects. Overfilling of upland cells at expanded Poplar Island is reduced by approximately 17% by bringing Mid-Bay on line in 2023.

Placement Starting in 2018. The latest possible date for placement at the Mid-Bay site was assumed to be 2018, which corresponds to a more realistic date for initial placement at Mid-Bay, and precedes potential placement capacity shortage at the expanded Poplar island site. The analysis shows overlapping placement activity from 2018 through 2027, at which time all remaining dredged material placement is assumed by the Mid-Bay site. Placement is required at both sites only once, thereby minimizing the extra costs incurred by double mobilization of dredged material off-loading equipment. By 2018, most of the wetland cell placement for expanded Poplar Island would have been completed. The development of both wetland and upland habitat would be delayed by approximately one year under this scenario. In this scenario, wetland development at Mid-Bay would begin in 2029, just after all dredged material placement would have shifted to the Mid-Bay site. Overfilling of upland cells at expanded Poplar Island is reduced by approximately 34% by bringing Mid-Bay on line in 2018.

MID-BAY PLACEMENT SUMMARY

Total Area (acres)	Alternative	Wetland Area (acres)	Capacity (mcy)	Capacity Ratio Up/Wet	Last Year @ 3.2 mcy	Years of Cell Overload	No. Wetland Cells per Year	Last Wetland Placement	Last Upland Placement
600	70% Upland-30% Wetland	180	27.5	90.3%	Year 8	8	2	Year 8	Year 9
700	70% Upland-30% Wetland	210	32.0	90.3%	Year 10	7	2	Year 8	Year 11
1000	70% Upland-30% Wetland	300	45.8	90.3%	Year 15	0	2	Year 9	Year 15
1200	50% Upland-50% Wetland	600	44.3	75.0%	Year 13	3	2	Year 14	Year 14
1354	50% Upland-50% Wetland	677	50.0	80.0%	Year 15	0	2	Year 14	Year 16
1354	45% Upland-55% Wetland	745	47.0	76.6%	Year 14	0	2	Year 15	Year 15
1354	45% Upland-55% Wetland-+25 MLLW Upland	745	53.3	79.4%	Year 16	0	2	Year 15	Year 17
1354	40% Upland-55% Wetland-+25 MLLW Upland	812	49.7	75.9%	Year 15	4	2	Year 16	Year 16
1354	40% Upland-55% Wetland-+30 MLLW Upland	812	55.4	78.4%	Year 16	6	2	Year 16	Year 17
1400	50% Upland-50% Wetland	700	51.7	75.6%	Year 16	0	2	Year 15	Year 17
1400	40% Upland-60% Wetland-+25 MLLW Upland	840	51.4	75.8%	Year 16	2	2	Year 17	Year 17
1400	40% Upland-60% Wetland-+30 MLLW Upland	840	57.3	78.4%	Year 17	4	2	Year 16	Year 18
1500	50% Upland-50% Wetland	750	55.4	75.0%	Year 17	0	2	Year 15	Year 18
1500	40% Upland-60% Wetland	900	48.7	72.7%	Year 15	0	2	Year 18	Year 16
1500	40% Upland-60% Wetland w/ Accelerated Wet Dev.	900	48.7	72.7%	Year 15	1	3	Year 16	Year 16
1500	40% Upland-60% Wetland w/ +25 MLLW Upland	900	55.0	75.9%	Year 17	0	2	Year 18	Year 18
1500	40% Upland-60% Wetland w/ +30 MLLW Upland	900	61.4	78.4%	Year 19	1	2	Year 18	Year 20
1500	30% Upland-70% Wetland	1050	42.1	58.3%	Year 11	1	2	Year 20	Year 15
1586	50% Upland-50% Wetland	793	58.5	80.0%	Year 18	0	2	Year 16	Year 19
1586	45% Upland-55% Wetland	872	55.0	76.6%	Year 17	0	2	Year 17	Year 18
1586	45% Upland-55% Wetland w/ +25 MLLW Upland	872	62.5	79.4%	Year 19	0	2	Year 17	Year 20
1586	40% Upland-60% Wetland	952	51.5	72.7%	Year 16	0	2	Year 18	Year 17
1586	40% Upland-60% Wetland w/ +25 MLLW Upland	952	58.1	75.9%	Year 18	0	2	Year 18	Year 19
1586	40% Upland-60% Wetland w/ +30 MLLW Upland	952	64.8	78.4%	Year 20	0	2	Year 18	Year 21
1600	40% Upland-60% Wetland	960	52.0	72.7%	Year 16	0	2	Year 18	Year 17

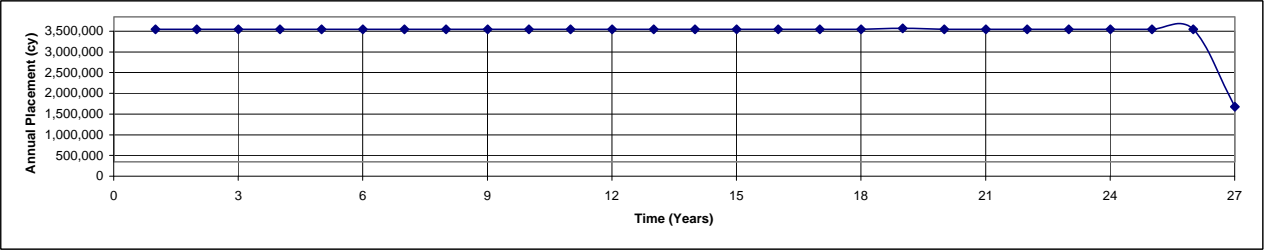
1600	40% Upland-60% Wetland-+25 MLLW Upland	960	58.7	75.9%	Year 18	0	2	Year 19	Year 19
1600	40% Upland-60% Wetland-+30 MLLW Upland	960	65.5	78.4%	Year 20	0	2	Year 19	Year 21
1800	40% Upland-60% Wetland	1080	58.4	72.7%	Year 18	0	2	Year 21	Year 19
1800	40% Upland-60% Wetland w/ +30 MLLW Upland	1080	73.6	78.4%	Year 23	0	2	Year 21	Year 24
1800	40% Upland-60% Wetland w/ Accelerated Wet Dev.	1080	58.4	72.7%	Year 18	0	2 to 4	Year 19	Year 19
1800	30% Upland-70% Wetland	1260	50.5	58.3%	Year 13	0	2	Year 24	Year 14
1800	30% Upland-70% Wetland w/ +47 MLLW Upland	1260	81.2	77.1%	Year 25	5	2	Year 24	Year 26
2700	45% Upland-55% Wetland	1750	93.7	77.6%	Year 29	0	2	Year 26	Year 30
2700	40% Upland-60% Wetland	1750	87.7	73.7%	Year 27	0	2	Year 27	Year 28
2500	30% Upland-70% Wetland	1750	70.1	58.3%	Year 19	0	2	Year 30	Year 20
2500	30% Upland-70% Wetland w/ Accelerated Wet Dev.	1750	70.1	63.2%	Year 21	0	3	Year 25	Year 22
2072	Alignment 5 - James 50%Upland-50%Wetland	1036	84.6	76%	Year 26	0	2	Year 20	Year 27
2072	Alignment 5 - James 45%Upland-55%Wetland	1140	78.8	73.30%	Year 24	0	2	Year 20	Year 25
2072	Alignment 5 - James 45%Upland-55%Wetland w/ Borrow Excavation	1140	95.7	78.00%	Year 29	0	2	Year 20	Year 30
2072	Alignment 5 - James 40%Upland-60%Wetland	1243	67.3	72.70%	Year 20	0	2	Year 23	Year 21
2072	Alignment 5 - James 40%Upland-60%Wetland w/ Borrow Excavation	1243	89.4	74.20%	Year 27	0	2	Year 21	Year 28
2072	Alignment 5 - James 40%Upland-60%Wetland-+25 MLLW Uplands	1243	76.0	75.80%	Year 23	0	2	Year 23	Year 24
2072	Alignment 5 - James 40%Upland-60%Wetland-+30 MLLW Uplands	1243	84.7	78.30%	Year 26	0	2	Year 23	Year 27
2756	Alignment D5 - 50%Upland-50%Wetland	1378	101.7	80%	Year 31	0	2	Year 22	Year 32
2756	Alignment D5 - 45%Upland-55%Wetland	1516	91.9	77.90%	Year 28	0	2	Year 24	Year 29
2756	Alignment D5 - 40%Upland-60%Wetland	1654	85.9	74.10%	Year 26	0	2	Year 26	Year 27
2756	Alignment D5 - 40%Upland-60%Wetland-+25 MLLW Uplands	1654	97.6	77.20%	Year 31	0	2	Year 26	Year 32

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Annual Placement - 2072 Acres -50% Upland and 50% Wetland-No Borrow Excavation Included

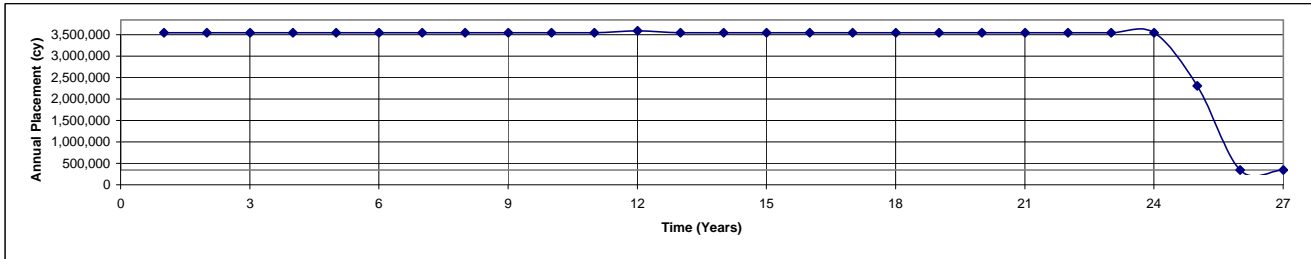
	Cell No.	Cell Acreage	Placement Acreage	Volume	Capacity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Total Placed Quantity	
Upland		1036	948	44,962,690	64,232,414	2,184,079	1,879,303	1,787,870	1,748,685	1,748,685	1,748,685	1,748,685	2,038,948	1,980,895	1,890,913	1,839,392	1,794,038	1,771,361	1,748,685	2,474,342	2,837,171	3,018,586	3,109,293	3,177,323	3,177,323	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	1,328,154	Grade	Grade	Plant	Plant	64,232,414
W-1	37	33.9	507,960	725,658	507,960	152,388	45,716	19,593	Grade	Plant																											725,658	
W-2	37	33.9	507,960	725,658	507,960	152,388	45,716	19,593	Grade	Plant																											725,658	
W-3	37	33.9	507,960	725,658	0	507,960	152,388	45,716	19,593	Grade	Plant																										725,658	
W-4	37	33.9	507,960	725,658	0	507,960	152,388	45,716	19,593	Grade	Plant																										725,658	
W-5	37	33.9	507,960	725,658	0	0	507,960	152,388	45,716	19,593	Grade	Plant																									725,658	
W-6	37	33.9	507,960	725,658	0	0	507,960	152,388	45,716	19,593	Grade	Plant																									725,658	
W-7	37	33.9	507,960	725,658	0	0	0	507,960	152,388	45,716	19,593	Grade	Plant																								725,658	
W-8	37	33.9	507,960	725,658	0	0	0	507,960	152,388	45,716	19,593	Grade	Plant																								725,658	
W-9	37	33.9	507,960	725,658	0	0	0	0	507,960	152,388	45,716	19,593	Grade	Plant	Plant																						725,658	
W-10	37	33.9	507,960	725,658	0	0	0	0	507,960	152,388	45,716	19,593	Grade	Plant																							725,658	
W-11	37	33.9	507,960	725,658	0	0	0	0	0	507,960	152,388	45,716	19,593	Grade	Plant	Plant																					725,658	
W-12	37	33.9	507,960	725,658	0	0	0	0	0	507,960	152,388	45,716	19,593	Grade	Plant	Plant																					725,658	
W-13	37	33.9	507,960	725,658	0	0	0	0	0	0	507,960	152,388	45,716	19,593	Grade	Plant																					725,658	
W-14	37	33.9	507,960	725,658	0	0	0	0	0	0	507,960	152,388	45,716	19,593	Grade	Plant																					725,658	
W-15	37	33.9	507,960	725,658	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant																	725,658	
W-16	37	33.9	507,960	725,658	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant																	725,658	
W-17	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant	Plant															725,658	
W-18	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant																725,658	
W-19	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant	Plant														725,658	
W-20	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant															725,658	
W-21	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant														725,658	
W-22	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant													725,658	
W-23	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant												725,658	
W-24	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant												725,658	
W-25	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant										725,658		
W-26	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant										725,658		
W-27	37	33.9	507,960	725,658	0	0	0	0	0	0	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant									725,658		
W-28	37	33.9	507,960	725,658	0.760	0	0	0	0	0	0	0	0	0	0	0	0	0	362,829	181,414	90,707	45,354	22,677	11,338	11,338	Grade	Plant									725,658		
Total		2,072			84,550,831	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,222,677	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	1,328,154	0	0	0	0	84,550,831	

Optimum Annual Upland Placement Quantity = 4,588,030
Cell overload defined as more than 20% above optimum



Annual Placement - 2072 Acres -45% Upland and 55% Wetland																																			
Cell No.	Cell Acreage	Placement Acreage	Volume	Capacity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Total Placed Quantity
Upland	932	853	40,449,061	57,784,373	2,148,769	1,833,400	1,738,789	1,698,241	1,698,241	1,698,241	1,698,241	1,998,593	1,938,523	1,845,414	1,792,101	1,792,101	1,721,706	1,698,241	2,449,121	2,824,560	3,012,280	3,106,140	3,153,070	3,176,535	3,200,000	3,200,000	3,200,000	3,200,000	1,962,062	Grade	Grade	Plant	Plant		57,784,373
W-1	38,286	35.0	525,615	750,879	525,615	157,685	47,305	20,274	Grade	Plant																									750,879
W-2	38,286	35.0	525,615	750,879	525,615	157,685	47,305	20,274	Grade	Plant																									750,879
W-3	38,286	35.0	525,615	750,879	0	525,615	157,685	47,305	20,274	Grade	Plant																								750,879
W-4	38,286	35.0	525,615	750,879	0	525,615	157,685	47,305	20,274	Grade	Plant																								750,879
W-5	38,286	35.0	525,615	750,879	0	0	525,615	157,685	47,305	20,274	Grade	Plant																							750,879
W-6	38,286	35.0	525,615	750,879	0	0	525,615	157,685	47,305	20,274	Grade	Plant																							750,879
W-7	38,286	35.0	525,615	750,879	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																						750,879
W-8	38,286	35.0	525,615	750,879	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																						750,879
W-9	38,286	35.0	525,615	750,879	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																					750,879
W-10	38,286	35.0	525,615	750,879	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																					750,879
W-11	38,286	35.0	525,615	750,879	0	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																				750,879
W-12	38,286	35.0	525,615	750,879	0	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																				750,879
W-13	38,286	35.0	525,615	750,879	0	0	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																			750,879
W-14	38,286	35.0	525,615	750,879	0	0	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																			750,879
W-15	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant															750,879
W-16	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant															750,879
W-17	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant														750,879
W-18	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant														750,879
W-19	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant													750,879
W-20	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant													750,879
W-21	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant												750,879
W-22	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant												750,879
W-23	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant											750,879
W-24	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant										750,879
W-25	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant										750,879
W-26	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant										750,879
W-27	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant									750,879
W-28	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant									750,879
Total	2,072			78,808,992	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,246,930	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	1,962,062	0	0	0	0	0	78,808,992

Optimum Annual Upland Placement Quantity = 4,127,455
Cell overload defined as more than 20% above optimum
Wetland Cell Acreage is Reduced by 68 Acres due to Tidal Gult



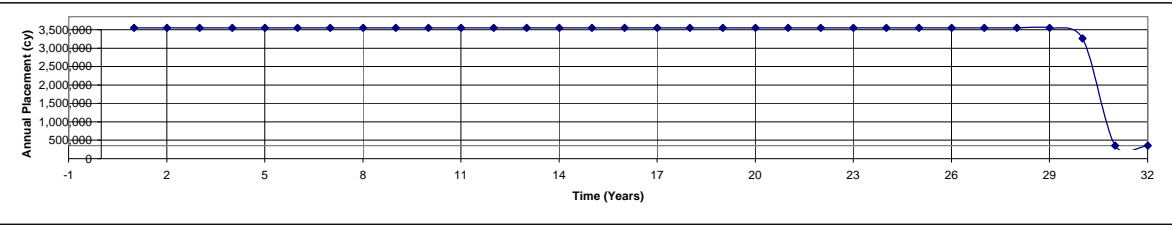
Annual Placement - 2072 Acres -45% Upland and 55% Wetland

	Cell Acreage	Placement Acreage	Volume	Capacity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32	Year 33	Year 34	Total Placed Quantity
Upland	932	853	52,281,099	74,687,285	2,148,769	1,833,400	1,738,789	1,698,241	1,698,241	1,698,241	1,698,241	1,998,593	1,938,523	1,845,414	1,792,101	1,745,171	1,721,706	1,698,241	2,449,121	2,824,560	3,012,280	3,106,140	3,153,070	3,176,535	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	2,911,904	Grade	Grade	Plant	Plant	74,687,285
W-1	38,286	35.0	525,615	750,879	525,615	157,685	47,305	20,274	Grade	Plant																													750,879
W-2	38,286	35.0	525,615	750,879	525,615	157,685	47,305	20,274	Grade	Plant																													750,879
W-3	38,286	35.0	525,615	750,879	0	525,615	157,685	47,305	20,274	Grade	Plant																												750,879
W-4	38,286	35.0	525,615	750,879	0	525,615	157,685	47,305	20,274	Grade	Plant																												750,879
W-5	38,286	35.0	525,615	750,879	0	0	525,615	157,685	47,305	20,274	Grade	Plant																											750,879
W-6	38,286	35.0	525,615	750,879	0	0	525,615	157,685	47,305	20,274	Grade	Plant																											750,879
W-7	38,286	35.0	525,615	750,879	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																										750,879
W-8	38,286	35.0	525,615	750,879	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																										750,879
W-9	38,286	35.0	525,615	750,879	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																									750,879
W-10	38,286	35.0	525,615	750,879	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																									750,879
W-11	38,286	35.0	525,615	750,879	0	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																								750,879
W-12	38,286	35.0	525,615	750,879	0	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																								750,879
W-13	38,286	35.0	525,615	750,879	0	0	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																							750,879
W-14	38,286	35.0	525,615	750,879	0	0	0	0	0	0	525,615	157,685	47,305	20,274	Grade	Plant																							750,879
W-15	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant																			750,879
W-16	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant																			750,879
W-17	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant																		750,879
W-18	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant																		750,879
W-19	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant																	750,879
W-20	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant																	750,879
W-21	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant																750,879
W-22	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant																750,879
W-23	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant															750,879
W-24	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant															750,879
W-25	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant														750,879
W-26	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant														750,879
W-27	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant													750,879
W-28	38,286	35.0	525,615	750,879	0	0	0	0	0	0	0	0	0	0	0	0	0	0	375,440	187,720	93,860	46,930	23,465	11,732	11,732	Grade	Plant												750,879
Total	2,072			95,711,904	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	2,911,904	0	0	0	0	95,711,904	

Optimum Annual Upland Placement Quantity = 4,127,455

Cell overload defined as more than 20% above optimum

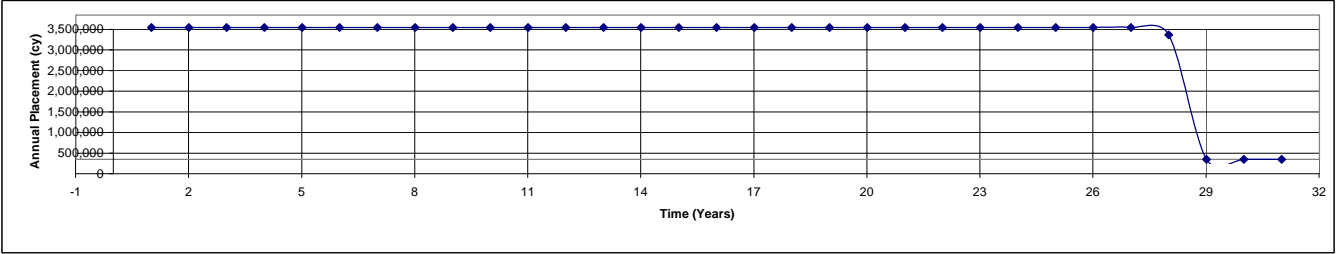
Wetland Cell Acreage is Reduced by 68 Acres due to Tidal Gut



Annual Placement - 2072 Acres -40% Upland and 60% Wetland

	Cell Acreage	Placement Acreage	Volume	Capacity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32	Total Placed Quantity	
Upland	828	758	46,447,157	66,353,081	2,123,673	1,800,775	1,703,906	1,662,390	1,662,390	1,662,390	1,662,390	1,816,151	1,939,160	1,860,742	1,785,783	1,734,466	1,698,428	1,674,403	1,662,390	2,431,195	2,815,598	3,007,799	3,103,899	3,151,950	3,175,975	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,017,230	Grade	Grade	Plant	Plant	66,353,081	
W-1	39.2	35.9	538,163	768,805	538,163	161,449	48,435	20,758	Grade	Plant																											768,805	
W-2	39.2	35.9	538,163	768,805	0	538,163	161,449	48,435	20,758	Grade	Plant																										768,805	
W-3	39.2	35.9	538,163	768,805	0	0	538,163	161,449	48,435	20,758	Grade	Plant																									768,805	
W-4	39.2	35.9	538,163	768,805	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																								768,805	
W-5	39.2	35.9	538,163	768,805	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																							768,805	
W-6	39.2	35.9	538,163	768,805	0	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																						768,805	
W-7	39.2	35.9	538,163	768,805	0	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																						768,805	
W-8	39.2	35.9	538,163	768,805	0	0	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																					768,805	
W-9	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																				768,805	
W-10	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																			768,805	
W-11	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																		768,805	
W-12	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																	768,805	
W-13	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																	768,805
W-14	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant																768,805
W-15	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	538,163	161,449	48,435	20,758	Grade	Plant															768,805
W-16	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-17	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-18	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-19	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-20	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-21	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-22	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-23	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-24	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-25	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-26	39.2	35.9	538,163	768,805	0.742	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-27	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-28	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-29	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
W-30	39.2	35.9	538,163	768,805	0	0	0	0	0	0	0	0	0	0	0	0	0	384,402	192,201	96,101	48,050	24,025	12,013	12,013	Grade	Plant											768,805	
Total	2,072			89,417,230	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,017,230	0	0	0	0	89,417,230			

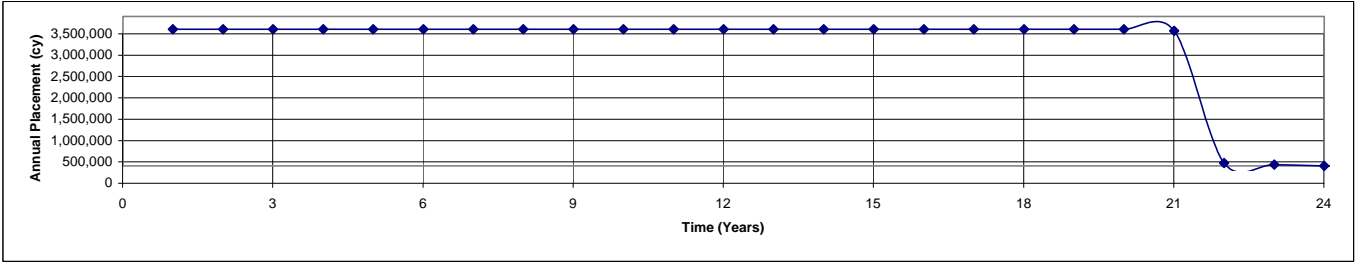
Optimum Annual Upland Placement Quantity = 3,666,881
Cell overload defined as more than 20% above optimum
Wetland Cell Acreage is Reduced by 68 Acres due to Tidal Gut



Annual Placement - 2072 Acres -40% Upland and 60% Wetland

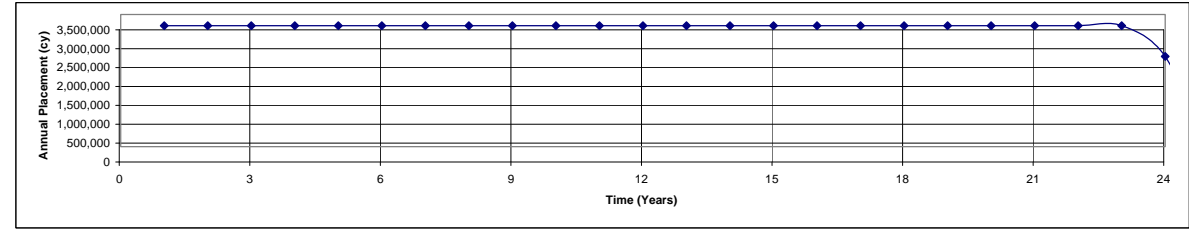
Cell No.	Cell Acreage	Placement Acreage	Volume	Capacity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Total Placed Quantity
Upland	828	758	34,224,221	48,891,744	2,485,859	2,271,616	2,207,344	2,179,798	2,179,798	2,179,798	2,179,798	2,179,798	2,179,798	2,383,839	2,343,030	2,279,778	2,243,561	2,211,679	2,179,798	2,179,798	2,179,798	2,179,798	2,689,899	2,944,950	3,032,208			Grade	Grade	Plant	Plant		48,891,744
W-1	34.555	31.6	357,071	510,101	357,071	107,121	32,136	13,773	Grade	Plant																							510,101
W-2	34.555	31.6	357,071	510,101	357,071	107,121	32,136	13,773	Grade	Plant																							510,101
W-3	34.555	31.6	357,071	510,101	0	357,071	107,121	32,136	13,773	Grade	Plant																						510,101
W-4	34.555	31.6	357,071	510,101	0	357,071	107,121	32,136	13,773	Grade	Plant																						510,101
W-5	34.555	31.6	357,071	510,101	0	0	357,071	107,121	32,136	13,773	Grade	Plant																					510,101
W-6	34.555	31.6	357,071	510,101	0	0	357,071	107,121	32,136	13,773	Grade	Plant																					510,101
W-7	34.555	31.6	357,071	510,101	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																				510,101
W-8	34.555	31.6	357,071	510,101	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																				510,101
W-9	34.555	31.6	357,071	510,101	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																			510,101
W-10	34.555	31.6	357,071	510,101	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																			510,101
W-11	34.555	31.6	357,071	510,101	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																		510,101
W-12	34.555	31.6	357,071	510,101	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																		510,101
W-13	34.555	31.6	357,071	510,101	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																	510,101
W-14	34.555	31.6	357,071	510,101	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																	510,101
W-15	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant															510,101
W-16	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant															510,101
W-17	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant															510,101
W-18	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant															510,101
W-19	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant												510,101
W-20	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant												510,101
W-21	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant											510,101
W-22	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant											510,101
W-23	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant										510,101
W-24	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant										510,101
W-25	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant									510,101
W-26	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant									510,101
W-27	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant									510,101
W-28	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant								510,101
W-29	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant								510,101
W-30	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant								510,101
W-31	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant							510,101
W-32	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant								510,101
W-33	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant							510,101
W-34	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant							510,101
W-35	34.555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant						510,101
W-36	34.555	31.6	357,071	510,101	0.727	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant				510,101
Total	2,072			67,255,377	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,159,733	63,763	31,881	0	0	0	0	0	67,255,377

Optimum Annual Upland Placement Quantity = 3,666,881
Cell overload defined as more than 20% above optimum



Annual Placement - 2072 Acres -40% Upland and 60% Wetland - Uplands to +25'																																			
Cell No.	Cell Acreage	Placement Acreage	Volume	Capacity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Total Placed Quantity
Upland	828	758	40,335,689	57,622,413	2,485,859	2,271,616	2,207,344	2,179,798	2,179,798	2,179,798	2,179,798	2,179,798	2,179,798	2,383,839	2,343,030	2,279,778	2,243,561	2,211,679	2,179,798	2,179,798	2,179,798	2,179,798	2,689,899	2,944,950	3,072,475	3,136,237	3,168,119	2,386,045			Grade	Grade	Plant	Plant	57,622,412
W-1	34,555	31.6	357,071	510,101	357,071	107,121	32,136	13,773	Grade	Plant																									510,101
W-2	34,555	31.6	357,071	510,101	357,071	107,121	32,136	13,773	Grade	Plant																									510,101
W-3	34,555	31.6	357,071	510,101	0	357,071	107,121	32,136	13,773	Grade	Plant																								510,101
W-4	34,555	31.6	357,071	510,101	0	357,071	107,121	32,136	13,773	Grade	Plant																								510,101
W-5	34,555	31.6	357,071	510,101	0	0	357,071	107,121	32,136	13,773	Grade	Plant																							510,101
W-6	34,555	31.6	357,071	510,101	0	0	357,071	107,121	32,136	13,773	Grade	Plant																							510,101
W-7	34,555	31.6	357,071	510,101	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																						510,101
W-8	34,555	31.6	357,071	510,101	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																						510,101
W-9	34,555	31.6	357,071	510,101	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																					510,101
W-10	34,555	31.6	357,071	510,101	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																					510,101
W-11	34,555	31.6	357,071	510,101	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																				510,101
W-12	34,555	31.6	357,071	510,101	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																				510,101
W-13	34,555	31.6	357,071	510,101	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																			510,101
W-14	34,555	31.6	357,071	510,101	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																			510,101
W-15	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																		510,101
W-16	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																		510,101
W-17	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																	510,101
W-18	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																	510,101
W-19	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant														510,101
W-20	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant														510,101
W-21	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant													510,101
W-22	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant													510,101
W-23	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant												510,101
W-24	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant												510,101
W-25	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant											510,101
W-26	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant											510,101
W-27	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant										510,101
W-28	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant										510,101
W-29	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant									510,101
W-30	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant									510,101
W-31	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant								510,101
W-32	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant								510,101
W-33	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant							510,101
W-34	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant							510,101
W-35	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant						510,101
W-36	34,555	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant					510,101
Total	2,072			75,986,045	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	2,386,045	0	0	0	0	0	0	75,986,045

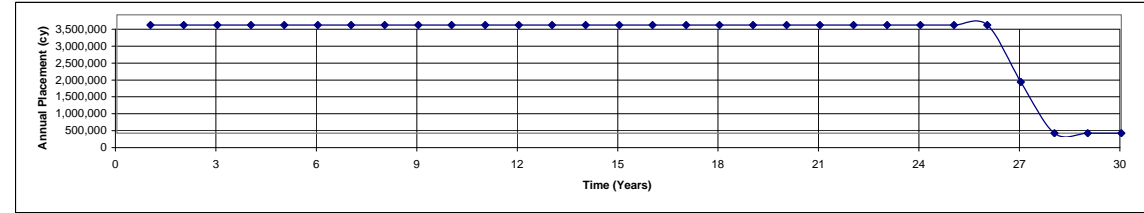
Optimum Annual Upland Placement Quantity = 3,666,881
Cell overload defined as more than 20% above optimum



Annual Placement - 2072 Acres -40% Upland and 60% Wetland - Uplands to +30'

Cell No.	Cell Acreage	Placement Acreage	Volume	Capacity	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30	Year 31	Year 32	Total Placed Quantity
Upland	828	758	46,447,157	66,353,081	2,485,859	2,271,616	2,207,344	2,179,798	2,179,798	2,179,798	2,179,798	2,179,798	2,179,798	2,383,839	2,343,030	2,279,778	2,243,561	2,211,679	2,179,798	2,179,798	2,179,798	2,179,798	2,179,798	2,689,899	2,944,950	3,072,475	3,136,237	3,168,119	3,200,000	3,200,000	3,200,000	1,516,714	Grade	Grade	Plant	Plant	66,353,081
W-1	34.6	31.6	357,071	510,101	357,071	107,121	32,136	13,773	Grade	Plant																											510,101
W-2	34.6	31.6	357,071	510,101	357,071	107,121	32,136	13,773	Grade	Plant																											510,101
W-3	34.6	31.6	357,071	510,101	0	357,071	107,121	32,136	13,773	Grade	Plant																										510,101
W-4	34.6	31.6	357,071	510,101	0	357,071	107,121	32,136	13,773	Grade	Plant																										510,101
W-5	34.6	31.6	357,071	510,101	0	0	357,071	107,121	32,136	13,773	Grade	Plant																									510,101
W-6	34.6	31.6	357,071	510,101	0	0	357,071	107,121	32,136	13,773	Grade	Plant																									510,101
W-7	34.6	31.6	357,071	510,101	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																								510,101
W-8	34.6	31.6	357,071	510,101	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																							510,101
W-9	34.6	31.6	357,071	510,101	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																							510,101
W-10	34.6	31.6	357,071	510,101	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																						510,101
W-11	34.6	31.6	357,071	510,101	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																						510,101
W-12	34.6	31.6	357,071	510,101	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																						510,101
W-13	34.6	31.6	357,071	510,101	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																					510,101
W-14	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																				510,101
W-15	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																				510,101
W-16	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																				510,101
W-17	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																			510,101
W-18	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	357,071	107,121	32,136	13,773	Grade	Plant																			510,101
W-19	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant																510,101
W-20	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant																510,101
W-21	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant																510,101
W-22	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant																510,101
W-23	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant															510,101
W-24	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant															510,101
W-25	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant														510,101
W-26	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant														510,101
W-27	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant													510,101
W-28	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant													510,101
W-29	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant												510,101
W-30	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant												510,101
W-31	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant											510,101
W-32	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant											510,101
W-33	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant										510,101
W-34	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant										510,101
W-35	34.6	31.6	357,071	510,101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant									510,101
W-36	34.6	31.6	357,071	510,101	0.783	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255,050	127,525	63,763	31,881	15,941	15,941	Grade	Plant								510,101
Total	2,072			84,716,714	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	1,516,714	0	0	0	0	0	84,716,714

Optimum Annual Upland Placement Quantity = 3,666,881
Cell overload defined as more than 20% above optimum



POPLAR ISLAND DREDGED MATERIAL PLACEMENT AND CELL DEVELOPMENT PLAN
EXISTING 1140-ACRE SITE WITH NORTHERN EXPANSION and 5-FOOT RAISING OF EXISTING UPLAND CELLS REFLECTING NMFS PROPOSAL (as modified by USACE)
(Open Water Area = Approximately 130 acres)

Cell No.	Cell Acreage	Cell Acreage	Cell Volume	Cell Capacity	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
	(Nominal)	(Actual)																		
U-2	326	298	2,406,206	3,437,437	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
U-6	243	222	1,793,583	2,562,261	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Up-10	270	247.1	11,359,359	16,227,656	0	0	0	0	0	0	0	0	0	0	1,434,866	1,434,866	1,434,866	1,434,866	1,434,866	1,434,866
U-2	326	298	10,913,555	15,590,792	6,399,848	1,038,000	0	1,111,000	535,347	894,394	0	700,000	1,500,000	1,450,000	0	0	0	0	500,000	600,000
U-6	243	222	11,926,728	17,038,183	0	0	0	0	0	400,000	1,700,000	1,120,114	1,075,000	1,280,028	1,219,723	1,460,710	982,614	895,534	949,649	1,045,435
W-1A	38	35	265,393	379,133	139,480	0	160,000	60,000	19,653	Grade	Plant									
W-1B	38	35	378,327	540,467	195,000	0	170,000	110,000	40,000	15,467	0	0	0	10,000	Grade	Plant				
W-1C	44	40	367,840	525,486	195,000	0	200,000	80,000	40,000	10,486	Grade	Plant								
W-1D	49	45	486,420	694,886	235,000	0	220,000	170,000	40,000	20,000	0	9,886	Grade	Plant						
W-3A	35	32	366,549	523,642	220,000	0	0	210,000	55000	21,000	0	10,000	0	7,642	Grade	Plant				
W-3B	30	28	275,557	393,653	290,000	0	0	75,000	20000	8,653	Grade	Plant								
W-3C	39	35	400,913	572,733	225,403	0	66,000	184,000	50000	30,000	0	10,000	0	7,330	0	Grade	Plant			
W-3D	31	26	251,680	359,543	284,500	62,000	12,000	Grade	Plant											
W-4A&B	34	31	150,040	214,343	0	0	0	0	0	0	0	0	0	0	0	130,000	65,000	19,343	Grade	Plant
W-4C	38	34	7,000	10,000	0	0	0	0	0	0	0	0	0	0	0	0	10,000	0	Grade	Plant
W-4DX	25	23	0	0	0	0	Plant													
W-5A	33	30	242,000	345,714	0	0	0	0	0	0	0	0	250,000	60000	25,000	10,714	Grade	Plant		
W-5B	33	30	266,200	380,286	0	0	0	0	0	0	0	0	0	275,000	65000	30,000	10,286	Grade	Plant	
W-5C	33	30	290,400	414,857	0	0	0	0	0	0	0	0	300,000	70000	30,000	14,857	Grade	Plant		
W-5D	57	53	1,710,133	2,443,048	0	0	0	0	1,200,000	600,000	300,000	150,000	75,000	40,000	30,000	20,000	20,000	8,048	0	0
W-1	25.0	22.9	369,050	527,214	0	0	0	0	0	0	0	0	0	0	395,411	98,853	23,066	9,885	Grade	Plant
W-2	43.3	39.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
W-3	43.3	39.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W-4	43.3	39.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W-5	47.0	43.0	763,195	1,090,279	0	0	0	0	0	0	0	0	0	0	0	0	654,167	261,667	87,222	43,611
W-6	41.0	37.5	665,766	951,095	0	0	0	0	0	0	0	0	0	0	0	0	0	570,657	228,263	76,088
W-7	52.0	47.6	2,072,585	2,960,835	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W-8	0.0	0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Grade
Water	130.0	130.0	0	0																
	1,691	1,544	68,183,543		8,184,231	1,100,000	828,000	2,000,000	2,000,000	2,000,000	2,000,000	2,000,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000

Embayment completed as part of initial expansion construction with no...

Cell No.	Cell Acreage	Cell Acreage	Cell Volume	Cell Capacity	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Total Placed Quantity
	(Nominal)	(Actual)																			
U-2	326	298	2,406,206	3,437,437	0	0	0	0	1,490,265	631,332	500,000	300,000	400,000	115,840	0	0	Grade	Grade	Plant	Plant	3,437,437
U-6	243	222	1,793,583	2,562,261	0	0	0	0	1,000,000	200,000	350,000	350,000	300,000	362,261	0	0	Grade	Grade	Plant	Plant	2,562,261
																					0
Up-10	270	247.1	11,359,359	16,227,656	1,434,866	1,434,866	1,434,866	2,604,123	709,735	0	0	Grade	Grade	Plant	Plant						16,227,656
U-2	326	298	10,913,555	15,590,792	611268	250935	0	0		See above for final grading and planting of raised Cell 2											15,590,792
U-6	243	222	11,926,728	17,038,183	1,094,016	1,473,371	1,746,112	595,877	0	0		See above for final grading and planting of raised Cell 2									17,038,182
W-1A	38	35	265,393	379,133																	379,133
W-1B	38	35	378,327	540,467																	540,467
W-1C	44	40	367,840	525,486																	525,486
W-1D	49	45	486,420	694,886																	694,886
W-3A	35	32	366,549	523,642																	523,642
W-3B	30	28	275,557	393,653																	393,653
W-3C	39	35	400,913	572,733																	572,733
W-3D	31	26	251,680	359,543																	358,500
W-4A&B	34	31	150,040	214,343																	214,343
W-4C	38	34	7,000	10,000																	10,000
W-4DX	25	23	0	0																	0
W-5A	33	30	242,000	345,714																	345,714
W-5B	33	30	266,200	380,286																	380,286
W-5C	33	30	290,400	414,857																	414,857
W-5D	57	53	1,710,133	2,443,048	Grade	Plant															2,443,048
W-1	25.0	22.9	369,050	527,214																	527,214
W-2	43.3	39.6	0	0																	0
W-3	43.3	39.6	0	0																	0
W-4	43.3	39.6	0	0	0																0
W-5	47.0	43.0	763,195	1,090,279	21,806	21,806	Grade	Plant													1,090,279
W-6	41.0	37.5	665,766	951,095	38,044	19,022	19,022	Grade	Plant												951,095
W-7	52.0	47.6	2,072,585	2,960,835	0	0	0	0		2,368,668	414,517	106,590	35,530	35,530	0	0	Grade	Plant			2,960,835
W-8	0.0	0.0	0	0	Plant																0
Water	130.0	130.0	0	0	...subsequent placement of materials																
	1,691	1,544		68,183,543	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	3,200,000	1,264,517	756,590	735,530	513,631	0	0	0	0	0	0	68,182,499

**Note placement at both
Poplar Island and
MidBay in 2029**

Poplar Island - Annual Dredged Material Placement with Mid-Bay Placement

Year	Poplar Expansion Placement (MCY)	Mid-Bay Placement (MCY)
2000	8,500,000	0
2001	1,000,000	0
2002	500,000	0
2003	1,500,000	0
2004	2,000,000	0
2005	2,000,000	0
2006	2,000,000	0
2007	2,000,000	0
2008	2,000,000	0
2009	3,200,000	0
2010	3,200,000	0
2011	3,200,000	0
2012	3,200,000	0
2013	3,200,000	0
2014	1,500,000	1,500,000
2015	1,500,000	1,500,000
2016	1,500,000	1,500,000
2017	1,500,000	1,500,000
2018	3,200,000	3,200,000
2019	0	3,200,000
2020	3,200,000	3,200,000
2021	3,200,000	3,200,000
2022	3,200,000	3,200,000
2023	3,200,000	3,200,000
2024	0	1,500,000
2025	3,200,000	1,500,000
2026	3,200,000	1,500,000
2027	3,200,000	1,500,000
2028	3,200,000	1,500,000
2029	0	1,500,000
2030	0	3,200,000
2031	0	3,200,000
2032	0	3,200,000
2033	0	3,200,000
2034	0	3,200,000
2035	0	3,200,000
2036	0	3,200,000
2037	0	3,200,000
2038	0	3,200,000
2039	0	3,200,000
2040	0	3,200,000
2041	0	3,200,000
2042	0	3,200,000
2043	0	3,200,000
2044	0	3,200,000
2045	0	3,200,000
2046	0	3,200,000
2047	0	3,200,000
2048	0	3,200,000
2049	0	3,200,000
2050	0	3,200,000
2051	0	3,200,000
2052	0	3,200,000
2053	0	3,200,000
2054	0	0

<u>POPLAR EXPANSION AREA NOTES</u>				
	<u>Area</u>	<u>% Area</u>	<u>Capacity</u>	<u>% Capacity</u>
wetland	174.0	57.26%	6,008,134	27.02%
water	129.9	42.74%	0	0.00%
upland	0	0.00%	16,227,656	72.98%
raising	569		5,999,699	
Total Upland Capacity			54,856,330	
Total Wetland Capacity			13,805,924	
Upland Placement Capacity Percentage			79.89%	
Total Expansion Capacity			28,235,488	

Optimum Annual Upland Placement Quantity = 4,127,455
Cell overload defined as more than 20% above optimum
Wetland Cell Acreage is Reduced by 68 Acres due to Tidal Gull
From 2072 acres to 2004 acres

MID-BAY PLACEMENT BEGINNING IN 2014

Note placement at both Poplar Island and MidBay in the four years 2023 through 2026

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graph TD
    A[Mid-Bay Annual Placement] --> D[Sum of Annual Placement at both Sites]
    B[Poplar Annual Placement] --> D
  
```

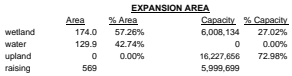


MID-BAY PLACEMENT BEGINNING IN 2023

Note placement at both
Poplar Island and
MidBay in 2027

MID-BAY PLACEMENT NOTES

Optimum Annual Upland Placement Quantity = 4,127,455
Cell overload defined as more than 20% above optimum
Wetland Cell Acreage is Reduced by 68 Acres due to Tidal Gu
From 2072 acres to 2004 acres



MID-BAY PLACEMENT NOTES

Optimum Annual Upland Placement Quantity = 4,127,455
Cell overload defined as more than 20% above optimum
Wetland Cell Acreage is Reduced by 68 Acres due to Tidal Gu
From 2072 acres to 2004 acres

**Represents Expanded Poplar
Placement Capacity Only**

MID-BAY PLACEMENT BEGINNING IN 2018